

# EE380 Spring 2018

## Micro Controllers and Logic Design

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### Digital MultiMeter (DMM)

For this project you may use an Nucleo processor purchased for use in EE354 and EE454. Your project should allow the user to select from three measurement types (Voltage, Current, and Capacitance). After the user has selected a measurement the measurement should be continually taken and printed to the screen (LCD or Computer terminal)(Data may be filtered for readability). Your meter measurement specifications are as follows.

Measurement Type	Range	tolerance
Voltage	0-20V	+-.01V
Current	0-100mA	+ - 10%
Capacitance	10nF-1UF	+ -10%

Submit: Hardware schematic, Notebook, calculations, and documentation. Your documentation should include a verification sheet signed and dated by Mark Randall, Jeff Cron, or Dick Blandford.

### Remote Control

Decode the output of a TV remote control.

1. Display the digits from 0-9 on an LCD display.
2. Use a three digit value to control 2 devices.
  - a. First Code should cause a servo to turn
  - b. Second Code turn a led off/on.

Submit: Hardware schematic, Notebook, calculations, and documentation. Your documentation should include a verification sheet signed and dated by Mark Randall.

### Two Channel PID Speed Motor Speed Control

For this project you must use the Nucleo processor purchased for use in EE354 and EE454. Your project will be to design a two channel motor controller. Your project should implement a two channel PID controlled speed controller that will control the speed of two DC motors. Your project should interface to the PC via the uart. From the PC the user should be able to change your PID coefficients allowing them to tune the controller (  $k_i$  ,  $k_d$ ,  $k_p$ ). The user should also be able to enter a speed (0 -100%) at the command line to change the speed of the motor. Your design will require two DC motors with digital encoders.

Submit: Hardware schematic, Notebook, calculations, and documentation. Your documentation should include a signed verification sheet.